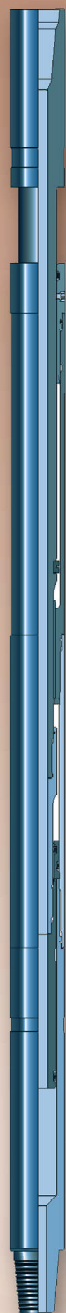


COILED TUBING JAR INTENSIFIER

Instruction Manual 4505



Hydraulic Up/Down Coiled Tubing Jar Intensifier

Coiled Tubing Jar Intensifier

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Hydraulic Up/Down Coiled Tubing Jar Intensifier

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Introduction

This instruction manual provides for the installation and maintenance of the Bowen Hydraulic Up/Down Coiled Tubing Jar Intensifier. The information contained within is a guide and in no way covers all possible conditions, which may exist in a field condition.

How this Manual is Organized

This describes the contents of the manual.

Section 1: General Description

Provides a general description of the Bowen Hydraulic Up/Down Coiled Tubing Jar Intensifier.

Section 2: Application

Provides the operator with the basic understanding of the general uses of the Coiled Tubing Jar Intensifier.

Section 3: Operation

Gives the general guidelines and procedures for operating the Coiled Tubing Jar Intensifier.

Section 4: Maintenance

This section provides the operator information and instruction required to properly maintain the Coiled Tubing Jar Intensifier.

Section 5: Disassembly

The proper sequence for the disassembly of the Coiled Tubing Jar Intensifier is covered in this section.

Section 6: Inspection

The operator is introduced to general information for inspecting and repairing the Coiled Tubing Jar Intensifier parts.

Section 7: Assembly

This assembly section instructs the operator in the special points of assembly and parts sequence to assemble the Coiled Tubing Jar Intensifier.

Section 8: Testing the Coiled Tubing Jar Intensifier

Provides the testing instructions and performance requirements of the Coiled Tubing Jar Intensifier.

Section 9: Fluid Bleeding for the Coiled Tubing Jar Intensifier

This section provides the specific instructions required to adjust the level of intensifier fluid in the Coiled Tubing Jar Intensifier.

Section 10: Coiled Tubing Jar Specifications

Numerous performance specifications and tightening torque are provided in the tables in this section.

Section 11: Coiled Tubing Jar Intensifier Diagram and Replacement Parts

Provides diagrams of each Coiled Tubing Jar Intensifier and the associated replacement part numbers.

Section 12: Coiled Tubing Jar Intensifier Service Kit

Provides a diagram and list of the contents contained in the Service Kit.

Conventions and Measurements

The following words mark special messages throughout this manual and alert the operator to specific information of WARNING, CAUTION, and NOTE, as described below:

WARNING: The text set off in this manner indicates failure to follow directions in the WARNING can result in bodily harm or loss of life.

CAUTION: The text set off in this manner indicates failure to follow directions in this CAUTION can result in damage to equipment.

NOTE: The text set off in this manner presents clarifying information or specific instructions to the items immediately following the NOTE.

The following information is provided to convert the units of measurement referred to in this document, to your specific standards:

Pounds x .4536 = Kilograms

Pounds/Square Inches (psi) x .006894757 = Megapascal or Newton/Millimeter²

Foot-Pounds x 1.355818 = Newton-Meter

(Fahrenheit – 32) x 5/9 = Celsius

Inches x 25.40 = Millimeters

Foot-Pounds x 1.355818 = Joule

This Instruction Manual includes information pertaining to the Hydraulic Up/Down Coiled Tubing Jar Intensifier, OD sizes: 1 11/16", 1 13/16", 2 1/8", 2 1/4", 2 7/8" and 3 1/8".

Section 1: General Description

The **Bowen Hydraulic Coiled Tubing Jar Intensifier** (Figure 1.1) is designed to be operated in conjunction with the Bowen Coiled Tubing Jar. It operates in a straight pull or push operation which intensifies the Jar force initiated by the Coiled Tubing Jar. Its function is to supply acceleration to the Weight Bar and the upper portion of the Jar during its (Jarring) free stroke. Each Bowen Coiled Tubing Intensifier is designed to match a corresponding Bowen Coiled Tubing Jar. The Bowen Coiled Tubing Jar Intensifier is essentially a hydraulic fluid spring which stores energy when a strain is pulled or pushed on the running string. When the strain is removed by the free stroke of the Jar, this stored energy is released, accelerating the Weight Bar and Jar until a blow of high impact is struck.

The variable impact of the Coiled Tubing Jar Intensifier is controlled by the metering action of the Jar, which is controlled by the degree of load placed on the Intensifier and the Jar. A lighter load creates a lighter impact on the tool. A stronger load will, in turn, generate a stronger impact on the tool. The Jar is a hydraulic design which allows for infinitely variable impact blows. The Intensifier amplifies the acceleration of the Jar action.

The comparatively large bore permits the use of drop balls for unlatching devices.

Section 2: Application

Prior to running any operation using the Coiled Tubing Jar Intensifier, it is necessary to properly configure the appropriate mass above and below the Intensifier, to achieve the desired inertia impact. It is therefore recommended to run the Bowen Fishing Jar Placement Program, which will provide the operator with an appropriate configuration for a proper intensified Jar impact while using the Intensifier.

Bowen Fishing Jar Placement Program

The Bowen Fishing Jar Placement Program is available to Bowen customers. The program should be run and used as a guide to optimize the string configuration and applied loads. This maximizes the likelihood of success in all Jarring operations. The program also provides information to avoid excessively high impact loads. The impact load information can be compared to the strength of the fishing string (to include all tools being used) and to the fish for possible limitations on pull and impact loads. Time spent running the program and planning the fishing job is very beneficial.

CAUTION: The Bowen Fishing Jar Placement Program is written specifically for Bowen Jars and Intensifiers, with the unique characteristics of each tool incorporated in the program.

General Guidelines for Coiled Tubing Fishing

Run the Coiled Tubing Jar, Weight Bar(s) and Coiled Tubing Jar Intensifier as close to the fishing tool as possible. The Weight Bar is usually 2 to 5 feet long. The lubricator must be of sufficient length to contain both the downhole fishing assembly and the fish.

NOTE: If the Intensifier and/or Weight Bar(s) are not run with the Jar, due to a desire to keep the bottomhole assembly short, the effectiveness of the Jar will not be fully utilized.

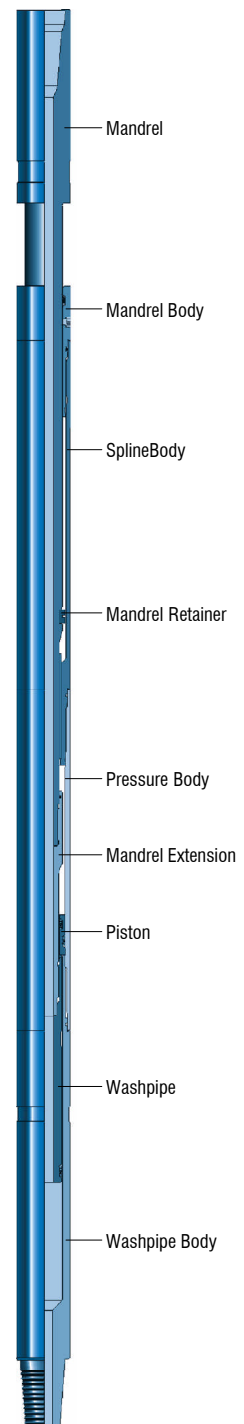


Figure 1.1
Hydraulic Coiled Tubing Jar Intensifier

Section 3: Operation

Preparation

Before using the Bowen Coiled Tubing Jar Intensifier, carefully examine it to ensure the tool has been assembled and filled correctly and no leaks are evident.

NOTE: All Bowen Coiled Tubing Jar Intensifiers give the best performance when using Bowen Liquid Spring Intensifier Fluid.

Insure the Intensifier is filled to the proper level with Bowen Liquid Spring Intensifier Fluid, and has been tested in a Bowen Coiled Tubing Jar and Coiled Tubing Jar Intensifier Tester or equivalent tester.

NOTE: Drift all the elements of the downhole fishing assembly with any drop balls which will be used.

The internal and external connections come from the Bowen manufacturing facilities with the proper torque. All external connections should be checked after use to ensure they are made up to the Recommended Torque. Refer to Table 11.2.

CAUTION: Do not tong on the threaded connections. To do so will damage the Intensifier. Tong the unit approximately 4 in. from the threads.

Rig Up

For the maximum effectiveness of Jar action, the Coiled Tubing Jar Intensifier should be carefully installed in the string above the Weight Bar, which is attached to the top of the Bowen Coiled Tubing Jar.

Use with Coiled Tubing Jar

The Coiled Tubing Jar Intensifier is always used in conjunction with a Coiled Tubing Jar. During conventional Jarring operations, the intensity of the blow struck is a function of, and proportional to, the accelerated rapid movement of the entire running string above the Jar. This accelerated movement will often be considerably diminished by friction of the running string against the wall of the

hole. In deviated and horizontal holes, the lack of available stretch in the running string below the kickoff point, causes a great loss in the effectiveness of expected acceleration. The Bowen Coiled Tubing Jar Intensifier provides the means to store the required energy immediately above the Jar, and effectively offset the loss of stretch or drag on the running string. The Bowen Coiled Tubing Jar Intensifier also has an important secondary contribution. The hydraulic fluid in the Intensifier cushions the shock of the running string, as it rebounds after each Jarring stroke. This reduces shock-damage to the tool and running string.

WARNING: The Coiled Tubing Jar is in the cocked (closed) position when it is shipped to the rig from the factory. Once closed, the Jar should not be left suspended, especially with any appreciable weight suspended below it. From this position, the Jar may open, dropping the length of its stroke, and may cause damage or injury.

Running Procedure Guidelines

After catching the fish, pull slowly to trip the Coiled Tubing Jar, but not to apply a substantial Jar blow. Then pick up to see if the fish is free or can be freed with tension. If not, start Jarring with minimal pull load. Increase the load after a few cycles and continue the Jarring operation. Increase the load and continue the cycle, as required, but not to exceed the load specifications. Refer to Table 11.1. The Up/Down Coiled Tubing Jar is capable of applying up only, down only, or up and down blows in succession. A series of up or down blows can be applied without having to apply the reverse Jarring cycle.

NOTE: The cycle life of the coiled tubing string should be considered when planning the Jarring load sequence.

Rig Down

The Coiled Tuning Jar Intensifier requires no specific action for Rig Down. It is recommended the Intensifier not remain suspended in the elevator for extended periods of time. After performing rig floor inspection for oil leaks, lay it on the derrick floor.

Section 4: Maintenance

This section covers information and equipment needed for the operator to successfully maintain the Bowen Coiled Tubing Jar Intensifier.

Maintenance of the Bowen Coiled Tubing Jar Intensifier is minimal, but important. The primary maintenance is normally confined to complete inspection and redressing after each prolonged or hard use, and careful checking after every moderate use. Magnetic particle inspection of stressed components should be performed after each use.

Rig Floor Maintenance

After moderate use on a short job, the Coiled Tubing Jar Intensifier can be kept at the rig site and requires only minor maintenance. In most cases this may be done on the rig floor.

Immediately after removing the Jar Intensifier from the fishing string, flush all mud from the bore, especially inside the Washpipe.

To prevent corrosion and facilitate tool make-up during the next tool use, coat the Intensifier joint box and pin threads with KOPR-KOTE(anti-gall grease.

Dressing Area Maintenance

After prolonged and/or hard use, the Bowen Coiled Tubing Jar Intensifier should be taken to an adequate dressing area and be completely disassembled, cleaned, inspected, and repaired, as required, and then reassembled.

Equipment

The following list of tools, equipment and parts should be obtained before starting:

- Bench Vise or Bowen Vise and Tong (suitable for the Intensifier size)
- Overhead Crane (2,000 lb minimum capacity)
- Pipe Wrenches (suitable for the OD's of interior and exterior Intensifier parts)
- Open-end Wrenches (suitable for wrench flats on the interior Intensifier parts)
- Nylon Strap (suitable for lifting and handling parts with the overhead crane without damaging the parts)
- Bowen Coiled Tubing Jar and Coiled Tubing Jar Intensifier Tester
- Setting Tools (35, 36, 37, 38) Refer to Table 12.1.
- Bowen Liquid Spring Intensifier Fluid
- Rubber Mallet
- Compete O-ring Packing Set
- KOPR-KOTE (for lubricating all the threads)
- Coiled Tubing Jar and Coiled Tubing Jar Intensifier Service Kit (155463) Refer to Figure 13.1.

Section 5: Disassembly

Included in this section are the steps for the operator to successfully complete the disassembly of the Coiled Tubing Jar Intensifier.

Disassembly Notes

1. The item numbers in parenthesis, in the following descriptions, will correspond to item numbers of parts in Figure 12.1.
2. National Oilwell recommends an assembly drawing be used when disassembling the tool. Assembly drawings, per part number, are available through National Oilwell.

3. To prevent damaging parts during servicing, **DO NOT** use the vise or wrenches over the Fill Plug (8) holes, on any of the seal surfaces, or any of the other smooth surfaces. Wrench areas are marked on the internal parts.
4. When disassembling the Coiled Tubing Jar Intensifier, note the direction and location of all O-rings, and back-up rings. This will help in the reassembly of the Intensifier later.
5. All threads are right-handed.

Complete Disassembly

For complete disassembly of the Bowen Coiled Tubing Jar Intensifier, proceed as follows:

WARNING: DO NOT remove the Fill Plugs until the tool is fully disassembled. The possibility of trapped residual high pressure exists and can cause possible injury to personnel or damage to the tool.

1. Position the Intensifier in the vise and clamp securely on the Spline Body (12).
2. Break the connection between the Pressure Body (18) and the Spline Body. When you have unscrewed it 3/4 inch, **STOP!** Allow any trapped pressure to escape before continuing to disassemble the tool. Place a pan under the connection to catch any hydraulic fluid. **DO NOT** unscrew the Pressure Body further at this time.

WARNING: DO NOT stand at either end of the tool until the Washpipe Body is removed.

3. Reposition the tool in the vise and clamp on the Pressure Body (18) securely.
4. Using an open-end wrench, break the connection between the Washpipe Body (31) and the Pressure Body (18). Slowly unscrew the Washpipe Body.

5. Slowly unscrew the Washpipe (26) from the Mandrel Extension (15). Place a pan under the connection to catch any hydraulic fluid that may drain out.
6. Reposition the tool in the vise and clamp on the Spline Body (12).
7. Slowly unscrew the Pressure Body and let the fluid drain into the pans (DO NOT reuse this fluid unless it is properly filtered using the Bowen Silicone Fluid Reclamation Unit, Part Number 80960). Unscrew the Pressure Body and drain any additional fluid into the pans.

NOTE: The Piston (19) will probably remain inside the Pressure Body (18) when it is unscrewed from the Spline Body.

8. Set the Pressure Body (18) upright on a piece of wood or rubber. Using a brass rod or a piece of wood, tap the Piston out of the Pressure Body.
9. Using an open-end wrench, break the connection between the Mandrel Extension (15) and the Mandrel (1). Unscrew the Mandrel Extension.
10. Reposition the Jar in the vise and clamp onto the Mandrel Body (2).
11. Break the connection between the Spline Body (12) and the Mandrel Body. Unscrew the Spline Body. Remove the Spline Body and drain any additional fluid into the pans.

NOTE: The Mandrel (1) will turn with the Spline Body (12).

12. Reposition the Jar in the vise and clamp onto the Mandrel (1).
13. Remove the Mandrel Retainer (10) and the O-ring which holds it in place.
14. Slide the Mandrel Body (2) off of the Mandrel (1).

15. Remove the Fill Plug (8) from the Mandrel Body (2).
16. Remove all O-rings and back-up rings from all parts using a No. 625 or No. 626 tool from the Coiled Tubing Jar Intensifier Service Kit (see Figure 13.1), or a screwdriver with its tip bent at an 80 to 90 degree angle. Be careful not to damage the seal grooves or other surfaces of the parts.
17. Immediately after disassembly of the Intensifier, thoroughly clean and inspect all the metal parts.

Section 6: Inspection

Included in this section are the steps for the operator to successfully complete the inspection of the Coiled Tubing Jar Intensifier.

Inspection Notes

- Refer to Figure 12.1 for the location of parts during inspection. The item numbers in parenthesis, in the following descriptions, will correspond to item numbers in Table 12.1 and Figure 12.1.
- National Oilwell recommends an assembly drawing be used when inspecting the tool. Assembly drawings, per part number, are available through National Oilwell.
- The types of damage to inspect for are: pits, nicks, scratches, burrs, cracks, galled areas, worn areas, etc.
- Minor damage may be removed by polishing with "fine" emery cloth.
- Parts with major damage must be replaced or undergo a more extensive repair process.
- Any abrasion on O-ring grooves or seal surfaces can damage the seals and result in a loss of fluid or pressure control during the operation of the tool.
- Any damaged areas left unrepaired can cause additional damage to the part and possibly other parts. This could result in the part(s) being un-repairable and/or in the Jar failing to work.

Inspection and Repair

Inspection and Repair Procedures should include the following:

1. Carefully clean all parts with solvent and wipe them dry with a clean, lint free cloth.
2. Inspect all box and pin thread sections of all parts.
3. Check the threads on all parts for damage. Minor damage may be removed with a triangular hand file before polishing with "fine" emery cloth.
4. Examine the seal surfaces, smooth surfaces and corners, sides and bottom of all O-ring grooves. If damage is found, take the appropriate action described above.
5. Examine the corners at the bottom of the O-ring grooves and corners at the bottom of the thread relief. Also, examine the threads (particularly the first 6 to 8 threads nearest the thread relief).

WARNING: Magnetic particle inspection is strongly recommended for locating fatigue cracks. Parts with cracks must be replaced.

6. Inspect the Fill Plug (8). If it is damaged, replace it.
7. Clean all parts following repair and polish required surfaces, making sure no steel filings, rust, grease or dirt remain on the parts.
8. If the Intensifier is not to be assembled soon after these inspections, coat each part with a light coat of oil. Place the parts on clean lint-free cloth.

Section 7: Assembly

Included in this section are the steps for the operator to successfully complete the assembly of the Coiled Tubing Jar Intensifier.

Assembly Notes

- National Oilwell recommends an assembly drawing be used when assembling the tool. Assembly drawings, per part number, are available through National Oilwell.
- The Coiled Tubing Jar Intensifier Replacement Parts list (Table 12.1) contains all components in the order in which they are assembled, with sub-assembly parts listed below each major component. An item number is assigned for each part name. Each item number and part name in Table 12.1 corresponds to the part illustration in Figure 12.1.
- Part numbers are specific to Intensifier OD sizes, as indicated in the parts listing.

CAUTION: The Bowen Coiled Tubing Jar Intensifier is a hydraulic Jar; therefore, close tolerances and smooth finishes are mandatory. Also, the Intensifier must be kept free of contamination (dirt, sand, metal shavings, etc.). Care must be taken to insure that no KOPR-KOTE ends up in the Intensifier Fluid wetted areas of the Intensifier. Contamination left on the parts can damage them or the seals and could result in malfunction of the Jar.

- To prevent damage during servicing, do not use vise, tongs, wrenches or chains over the Fill Plugs (8), on any seal surfaces, or on any other smooth surface of the tool.
- All connections are made with right-handed threads and should be coated with KOPR-KOTE, taking care not to lubricate above the thread relief. Remove excess KOPR-KOTE from the threads.

- Due to the weight of some of the Intensifier components, it may be necessary to assemble the unit with a 2,000 lb. capacity overhead hoist.
- Before assembly, make sure all parts are clean and in good condition. Installing marginal components will cause time loss and cost more than replacing the worn components.
- All metal parts should be thoroughly steam cleaned or washed with a good grade solvent. The parts should be blown dry with shop air or wiped with clean, soft, lint-free cloths. The parts should then be thoroughly oiled with clean Intensifier Fluid.
- Use clean Intensifier Fluid (40) to lubricate all internal parts during the assembly.
- It is recommended that the Jar be redressed with a new O-ring Packing Set (39), which consists of all O-rings for the specific Intensifier.
- Replace any Non-Extrusion and Seal Protector Rings as necessary.
- Use a pipe wrench to tighten the external parts. The internal parts should be tightened according to the noted procedure.
- The Tightening Torque Values (see Table 11.2) lists the recommended torque that should be applied to the corresponding threaded connection in the Intensifier.
- Wrench areas are marked on the internal parts.

Pre-Assembly

Prior to Main Assembly, Non-Extrusion Rings, Seal Protector Rings, and O-rings should be installed on the Mandrel Body (2), Piston (19), and Washpipe (26). Refer to Figure 7.1, Figure 7.2 and Figure 7.3

Coat all Non-Extrusion Rings, Seal Protector Rings, and O-rings with clean Intensifier Fluid and install them in their proper grooves as detailed below:

1. Install one Non-Extrusion Ring, first. Ensure its beveled surface conforms to the beveled surface of the groove.
2. Install Seal Protector Ring(s), next. These are deformed slightly to permit entry into the body, then straightened and flattened by the use of the Seal Protector Ring Installation Tool No. 625 from the Coiled Tubing Jar and Coiled Tubing Jar Intensifier Service Kit. Refer to Figure 13.1.
3. Install the other Non-Extrusion Ring as explained above.
4. Install the O-ring.
5. The complete assembly is then set with the proper Setting Tool.

Mandrel (1), Mandrel Body (2), and Fill Plug (8)

1. Install the Mandrel Body Non-Extrusion Ring (3), Seal Protector Ring(s) (4), other Non-Extrusion Ring, and O-ring (5) into the ID of the stencil grove end of the Mandrel Body. Refer to Figure 7.1.

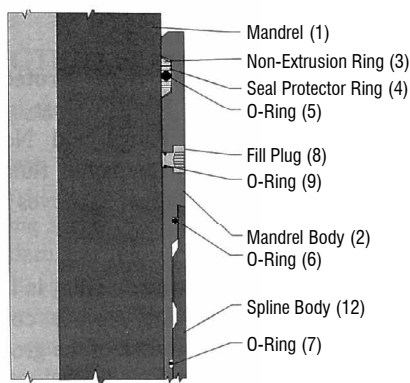


Figure 7.1
Mandrel Body

2. Install the Mandrel Body O-rings (6) and (7), on the OD of the non-stencil groove side of the Mandrel Body.
3. Use the O-ring Installation Tool for Fill Plug No. 147647 (see Figure 13.1), to install the O-ring (9) on the Fill Plug (8). A few drops of oil on this assembly tool will aid in the installation. Tighten the Fill Plug securely.

Piston (19)

1. Install a Non-Extrusion Ring (28), two Seal Protector Rings (29), and other Non-Extrusion Ring onto the OD of the Washpipe.

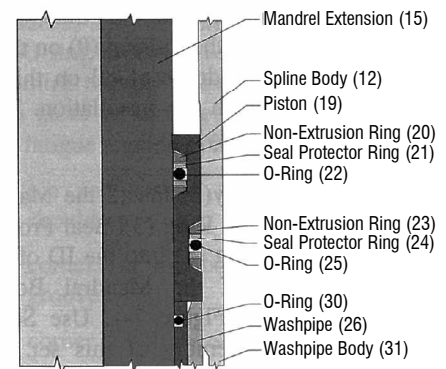


Figure 7.2
Piston

2. Then, install O-ring (27) onto the Washpipe. Refer to Figure 7.3.

Washpipe (26)

1. Install Non-Extrusion Ring (14), Seal Protector Ring (15), and O-ring (16) onto the ID of the Up Seal Body. Refer to Figure 7.3.

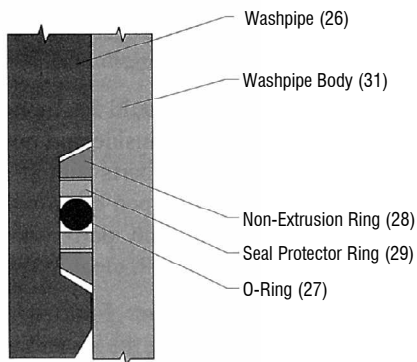


Figure 7.3
Washpipe

2. Install O-ring (18) onto the ID of the Mandrel Extension (17).

Main Assembly

1. Clamp the Mandrel (1) securely into an appropriate vise for assembly.
2. Lightly lubricate the Mandrel and slide the Mandrel Body (2) onto the Mandrel.
3. Install the Mandrel Retainer (10) and the Mandrel Retainer O-ring (11), which holds it in position, onto the Mandrel (1). Refer to Figure 7.4.

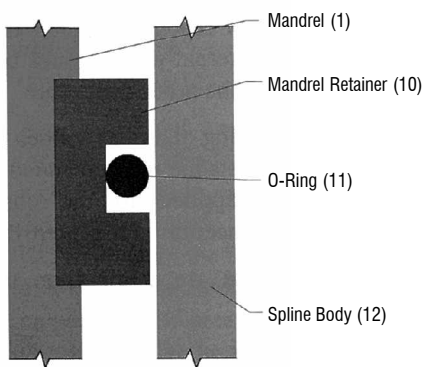


Figure 7.4
Mandrel Retainer

4. Apply light oil on the Mandrel Retainer O-ring and carefully install the Spline Body (12) over the Retainer. Make up the Mandrel Body (2) to the Spline Body. Torque the Spline Body to the appropriate value. Refer to Table 11.2.
5. Reposition the Jar in the vise and clamp on the Spline Body (12).
6. Screw the Mandrel Extension (15) on the Mandrel (1). Make up the connection to the appropriate torque using an open-end wrench. Refer to Table 11.2.
7. Screw the Pressure Body (18) on the Spline Body and torque to the appropriate value. Refer to Table 11.2.

Section 8: Filling the Coiled Tubing Jar Intensifier

To fill the Intensifier, complete the following procedure:

1. Remove the Intensifier from the vise and stand it on a piece of wood on the floor, with the Mandrel (1) end down.
2. Shift the parts and extend the neck of the Mandrel to distance (A) Total Stroke (see Table 11.1). After obtaining this required distance, insure that the parts do not move as you fill the tool. A split section of PVC tubing and hose clamps on the neck of the Mandrel can be used to maintain this distance.
3. Attach the Volume Pump Hose (Part No. 2581) to the Mandrel Body (2) Fill Plug (8) hole.

CAUTION: Use only Bowen Liquid Spring Intensifier Fluid (Part No. 50529) in the Bowen Coiled Tubing Intensifier.

4. Pump Bowen Liquid Spring Intensifier Fluid into the tool at a moderate speed, to allow uniform smooth flow. When the fluid rises to the start of the threads of the Pressure Body (18), stop pumping.
5. Slide the Piston (19) over the threads and gently push it into the annulus, between the Pressure Body and the Mandrel Extension (15). The fluid should overflow the Piston as it is inserted. You can use a brass rod to tap the Piston down. When the Piston is just past the threads, STOP.
6. Screw the Washpipe (26) onto the Mandrel Extension (15). During the last 1/2 inch of make-up, the Washpipe will be pushing the Piston further down into the annulus. Tighten the Washpipe to the appropriate value. Refer to Table 11.2.
7. Move the Intensifier to the horizontal position in the vise with the hose going up. Insure that the Mandrel has not moved from the set position.
8. Screw the Washpipe Body (31) onto the Pressure Body and tighten to the appropriate torque. Refer to Table 11.2.

NOTE: When installing the Piston, insure the ID seals in the Piston are placed over the Mandrel Extension (15) first. This may appear reversed (see Figure 7.2) because the Mandrel end is upside down during the filling procedure.

9. Remove the Volume Pump Hose and insert the Fill Plug (8) into the Mandrel Body (2). Tighten the Fill Plug securely.
10. Remove the PVC tubing at this time.

Section 9: Testing the Coiled Tubing Jar Intensifier

After the Coiled Tubing Jar Intensifier has been completely assembled and filled, it should be tested in a Bowen Coiled Tubing Jar and Coiled Tubing Jar Intensifier Tester (see Figure 9.1) or other suitable test rack which has a readout for the applied pull and push loads.

NOTE: The Bowen Coiled Tubing Jar Intensifier will not test the same in a test rack that is not able to pull as fast as a standard Bowen Coiled Tubing Jar and Coiled Tubing Jar Intensifier Tester operating at 60Hz power. The tester speed should be 2.5 ft/sec.

WARNING: The Bowen Coiled Tubing Jar Intensifier will generate extremely high internal pressures during testing! Follow proper safety precautions while testing the Intensifier.

To test the Intensifier, use the following procedure:

1. Place the Intensifier in the Bowen Coiled Tubing Jar and Coiled Tubing Jar Intensifier Tester.
2. Set the tester to the charted Testing Pull Load. Refer to Table 11.1.
3. Actuate the Intensifier in the Pull stroke. It may be necessary to adjust the load during the initial Pull Test.

NOTE: Observe the movement of the Intensifier during this time to assure that it is operating properly. Movement should be slow but steady with only minimal jerks or stops.

4. Pull open the Intensifier to it's full stroke in the tester. The Intensifier is fully open, when the length of the Mandrel neck is two times the dimension "A" Total Stroke. Refer to Table 11.1 and Figure 12.1.
5. Upon reaching full stroke, remove the applied load. The Intensifier should return to within 2 inches of dimension "A". If the Intensifier does not close to within 2 inches of dimension "A", it is an indication that too much residual air has been

entrapped in the Intensifier, producing an undesirable air cushion. In such a case, the filling procedure should be repeated.

6. Repeat the Pull Load Test sequence 4 to 6 times.
7. Upon completing the Pull Load Test, set the tester to the charted Testing Push Load. Refer to Table 11.1.
8. Actuate the Intensifier in the Pull stroke. It may be necessary to adjust the load during the initial Push Test.

NOTE: Observe the movement of the Intensifier during this time to assure that it is operating properly. Movement should be slow but steady with only minimal jerks or stops.

9. Push close the Intensifier to it's full stroke in the tester. The Intensifier is fully closed when the Mandrel bottoms out on the Mandrel Body.
10. Remove the applied load. The Intensifier should return to within 2 inches of dimension "A". If the Intensifier does not close to within 2 inches of dimension "A", it is an indication that too much residual air has been entrapped in the Intensifier, producing an undesirable air cushion. In such a case, the filling procedure should be repeated.
11. Repeat the Pull Load Test sequence 4 to 6 times.

Section 10: Fluid Bleeding Instructions for Coiled Tubing Jar Intensifiers

Coiled Tubing Jar Intensifier Fluid Bleeding Prior to Field Use

If the anticipated bottom hole temperature is greater than 180°F (82°C), then it is necessary to bleed a small amount of Intensifier Fluid from the tool, following testing, and prior to running it in the well. This insures that the internal pressures will not damage the tool at operating temperatures and rated loads.

WARNING: The Intensifier must be in the "As Assembled" position. This will insure that little or no pressure is in the tool when the Fill Plug is removed.

CAUTION: Before bleeding any fluid from the Intensifier, it must have been completely filled and tested. If any appreciable amount of air is in the tool at this time, the final amount of fluid in the tool will be less than required for the Jar to operate properly.

1. Place the Intensifier in the tester. Rotate the Intensifier until the Fill Plug is straight up.
2. Remove the plug and install the Fluid Bleed Valve Assembly (Part No. 155400). Ensure that all the valve component fittings are tight. Close the valve. Refer to Figure 10.1.

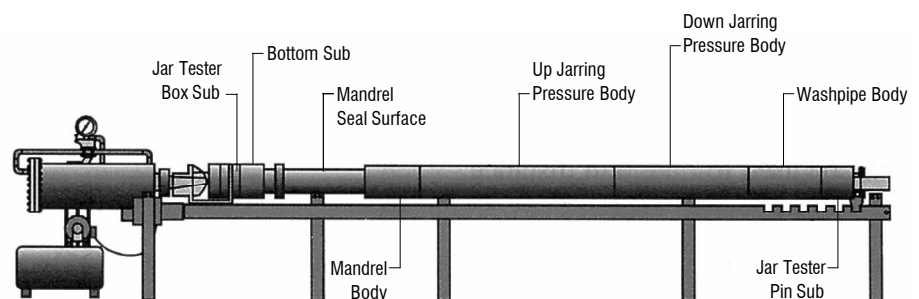


Figure 9.1
Testing the Coiled Tubing Jar Intensifier Illustrated

WARNING: DO NOT perform a Pull Test while the Fluid Bleed Valve is installed on the Coiled Tubing Jar. This action could result in serious injury to personnel.

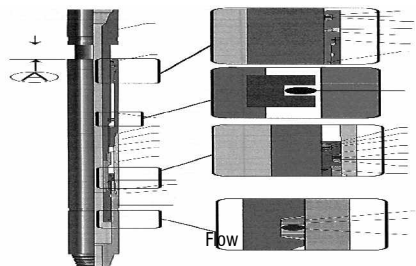


Figure 10.1
Fluid Bleed Valve Assembly

NOTE: If the Intensifier is not in the “As Assembled” position, (Dimension “A” Total Stroke) referenced in Table 11.1 and seen in Figure 11.1, it may be necessary to compress the Intensifier to this position to draw the fluid from the valve assembly back into the Intensifier.

11. Remove the Fluid Bleed Valve Assembly. Check the condition of the Fill Plug O-ring prior to installation. Replace the O-ring, as required, and install the Fill Plug. Tighten the Fill Plug securely.

3. Rotate the Intensifier until the Fluid Bleed Valve is straight down.
4. Place the graduated cylinder below the valve to catch and measure the amount of oil that is bled out of the Intensifier. Refer to Table 11.3 for the proper amount of fluid to bleed from the Intensifier.
5. Slowly open the valve and allow the Intensifier Fluid to drain into the cylinder.
6. Pull the Intensifier slowly to increase the flow rate.
7. When the specified amount is in the cylinder, close the valve.
8. At the same time stop the pull stroke and return the Intensifier to its neutral position.
9. Rotate the Intensifier until the valve is straight up.
10. Open the valve and allow the fluid remaining in the valve assembly to drain into the Intensifier.

Section 1 1: Coiled Tubing Jar Intensifier Specifications

Table 1 1.1: Coiled Tubing Jar Intensifier Specifications

OD Size (in)	1-11/16	1-13/16	2-1/8	2-1/4	2-7/8	3-1/8
ID Size (in)	9/16	9/16	3/4	3/4	1	1-1/4
Assembly Part Number	155969	153965	154412	154412	156341	154440
Standard Connection	1 AM M.T.	1 AM M.T.	1-1/4 API Reg	1-1/4 API Reg	2-3/8 AM-PAC	2-3/8 API Reg
Overall Length – Neutral (in)	76	73	87	87	104	104
(A) Total Stroke (in)	6	6	7	7	8	8
Approximate Weight (lb)	33	37	54	63	108	138
Maximum Overpull (lb)	10,000	12,000	18,000	22,000	32,000	40,000
Maximum Overpush (lb)	10,000	12,000	18,000	22,000	32,000	40,000
Maximum Lift After Jarring (lb) *	50,000	69,000	95,000	95,000	195,000	214,000
Torsion Yield (ft-lb) *	330	150	700	700	2,700	3,000
Testing Pull Load (lb)	8 - 10,000	9 - 11,000	11-14,000	11-14,000	25-30,000	28-36,000
Testing Push Load (lb)	6 - 8,000	7 - 9,000	7-10,000	7-10,000	16-20,000	18-22,000

NOTE: * Strengths listed are calculated theoretical yield points, and are accurate within 20%.

Table 1 1.2: Tightening Torque Specifications

OD Size (in)	1-11/16	1-13/16	2-1/8	2-1/4	2-7/8	3-1/8
ID Size (in)	9/16	9/16	3/4	2-1/4	1	1-1/4
Mandrel to Mandrel Extension	150	150	350	350	300	600
Mandrel Body to Spline Body	500	500	700	700	1200	2100
Spline Body to Pressure Body	500	500	700	1100	1200	2100
Pressure Body to Washpipe Body	500	500	700	700	1200	2100
Mandrel Extension to Washpipe	50	75	200	200	150	600

NOTE: Tightening Torque values are in ft-lb. The above make up torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque.

Table 1 1.3: Coiled Tubing Jar Intensifier Bleed Volumes

OD Size (in)	1-11/16	1-13/16	2-1/8	2-1/4	2-7/8	3-1/8
ID Size (in)	9/16	9/16	3/4	3/4	1	1-1/4
Amount of fluid to bleed (ml) {oz}	13 – 18 {.44 – .61}	6 – 9 {.20 – .30}	29 – 36 {.98 – 1.22}	14 – 22 {.47 – .74}	50–65 {1.69–2.20}	70 – 88 {2.37 – 2.98}

Pounds x .4536 = Kilograms

Pounds/Square Inches (psi) x .006894757 = Megapascal or Newton/Millimeter²

Foot-Pounds x 1.355818 = Newton-Meter

(Fahrenheit – 32) x 5/9 = Celsius

Inches x 25.40 = Millimeters

Foot-Pounds x 1.355818 = Joule

Section 12: Coiled Tubing Jar Intensifier Replacement Parts and Numbered Illustration

Table 12.1: Coiled Tubing Jar Intensifier Replacement Parts

OD Size (in)			1-11/16	1-13/16	2-1/8	2-1/4	2-7/8	3-1/8
ID Size (in)			9/16	9/16	3/4	3/4	1	1-1/4
	Assembly Part Number		155969	153965	154412††	154412††	156341	154440
Item No.	Part Description	No. Req.						
1†	MANDREL	1	154413††	153966	154413††	154413††	156342	154441
2	MANDREL BODY	1	154415/010	153967/010	154415/010	154415/010	156344/010	154442/010
3*	Non-Extrusion Ring	2	365/100	365/080	365/100	365/100	365/125	365/145
4*	Seal Protector Ring	2	375/011	375/085	375/011	375/011	375/130	375/145
5	O-ring	1	568222/020	568217/020	568222/020	568222/020	568328/020	568330/020
6	O-ring	(1) or (2)	154424/020 (2)	568126/020 (1)	154424/020 (2)	154424/020 (2)	568035/020 (1)	568036/020 (2)
7	O-ring	1	568031/020	568027/020	568031/020	568031/020	568037/020	568039/020
8*	FILL PLUG	1	689T/005	689T/005	689T/005	689T/005	617T/005	617T/005
9	O-ring	1	568005/021	568005/021	568005/021	568005/021	568005/021	568005/021
10	MANDREL RETAINER	1	155971/010	153973/010	154414/010	154414/010	156343/005	154443/010
11	O-ring	1	568023/020	568025/020	568029/020	568029/020	568032/020	568035/020
12	SPLINE BODY	1	155973/010	153968/010	154416/010	154416/011	156345/010	154444/010
13	O-ring	1	568027/020	568026/020	568031/020	568031/020	568037/020	568039/020
14	O-ring	1	568025/020	—	568030/020	568030/020	568035/020	568036/020
15	MANDREL EXTENSION	1	155974/010	153970/010	154418/010	154418/010	156346/010	154445/010
16	O-ring	1	568020/020	568022/020	568026/020	568026/020	568024/020	568031/020
17	O-ring	1	568016/020	—	568022/020	568022/020	568029/020	568028/020
18	PRESSURE BODY	1	155975/010	153969/010	154417/010	154417/010	156347/010	154446/010
19*	PISTON	1	155976/010	153971/010	154419/010	154419/010	156348/010	154447/010
20*	Non-Extrusion Ring	2	155982/005	154167/005	365/008	365/008	365/105	365/114
21*	Seal Protector Ring	2	155981/005	154166/005	375/090	375/090	375/110	375/120
22	O-ring	1	568118/020	568120/020	568218/020	568218/020	568325/020	568327/020
23*	Non-Extrusion Ring	2	155984/005	154169/005	366/118	366/118	366/090	366/110
24*	Seal Protector Ring	2	155983/005	154168/005	227/050	227/050	227/070	227/073
25	O-ring	1	568121/020	568123/020	568222/020	568222/020	568328/020	568330/020
26*	WASHPIPE	1	155977/010	153976/010	154420/010	154420/011	156349/010	154448/010
27	O-ring	1	568211/020	568213/020	568218/020	568218/020	568325/020	568327/020
28*	Non-Extrusion Ring	2	366/045	366/047	366/065	366/065	366/009	366/081
29*	Seal Protector Ring	2	379/023	82/027	227/032	227/032	227/062	277/065
30	O-ring	1	—	568020/020	—	—	—	—
31†	WASHPIPE BODY	1	155978	153977	154421††	154421††	156350	154449
32	O-ring	1	568027/020	568028/020	568031/020	568031/020	568037/020	568039/020
33	O-ring	1	—	—	—	—	568035/020	568036/020
REQUIRED ACCESSORIES								
34**	Service Kit	1	155463/005	155463/005	155463/005	155463/005	155463/005	155463/005
35**	Setting Tool	1	22709/020	22709/025	22709/008	22709/008	22709/051	22709/012
36**	Setting Tool	1	22709/030	22709/040	22709/029	22709/029	22709/037	22709/031
37**	Setting Tool	1	22729/012	22729/012	22729/031	22729/031	22729/014	22729/034
38**	Setting Tool	1	22729/032	22729/032	22729/029	22729/029	22729/005	22729/033
EXTRA								
39 * **	O-ring Packing Set	1	155985/010	153975/005	154422/010	154422/010	156351/005	154450/005
40 * **	Intensifier Fluid	1	50529	50529	50529	50529	50529	50529

* Recommended spare parts

** Items not shown in the tool illustration

† Specify thread

†† Specify OD

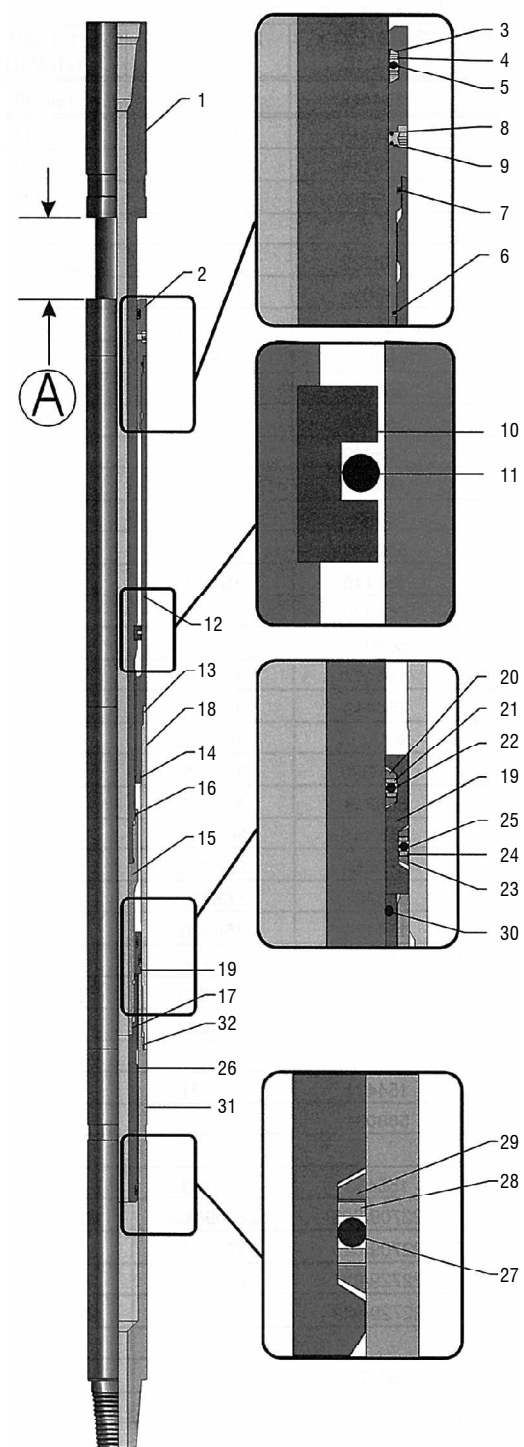


Figure 12.1
Coiled Tubing Jar Intensifier Parts Numbered

Section 13: Coiled Tubing Jar Intensifier Service Kit

A **Service Kit** is necessary to properly service the Intensifier. Because these Kits are identical for every size of Coiled Tubing Jar Intensifier, a single kit may be used for all Intensifiers at a particular site. The Kit does not include any Seal Setting Tools, four of which are required for each size of Intensifier. These Setting Tools must be ordered separately. They are usually stored in the Service Kit metal box. This Service Kit can also be used to service the Coiled Tubing Jars. It is required to purge the Intensifier fluid from the tank and hose. Clean the tank and refill with Bowen Jar Oil.

NOTE: This Service Kit illustration shows only those items necessary to service the Bowen Coiled Tubing Jar Intensifier. Additional items (not shown) are contained in this Service Kit to facilitate servicing the Bowen Coiled Tubing Jars.

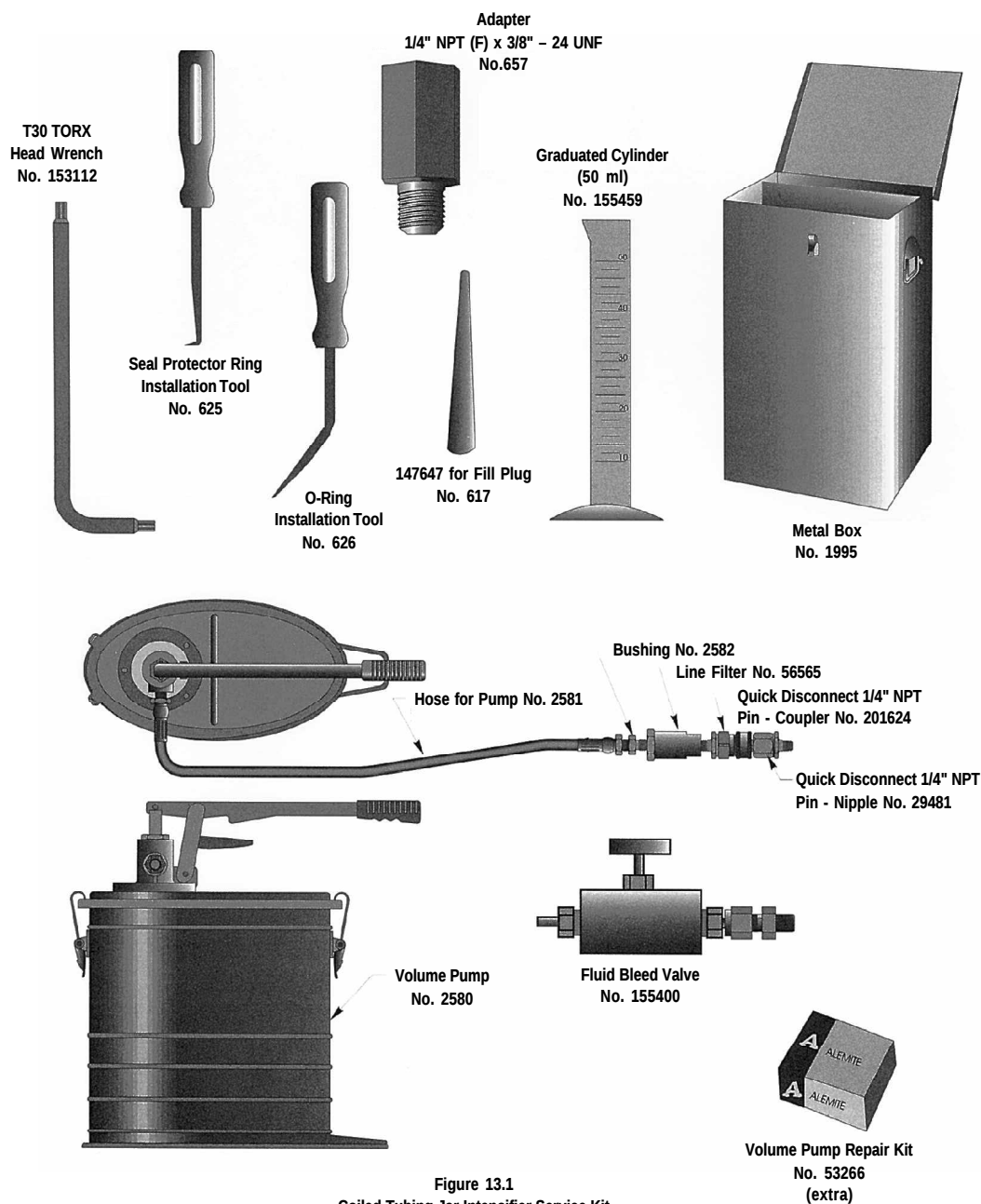


Figure 13.1
Coiled Tubing Jar Intensifier Service Kit

Corporate Headquarters

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Houston, Texas 77042
United States
Phone: 713 346 7500
Fax: 713 346 4493

Alaska
4111 Ingra
Anchorage, Alaska 99503
United States
Phone: 907 563 5253
Fax: 907 561 0071

California
4117 Atlas Court
Bakersfield, California 99308
United States
Phone: 661 395 0165
Fax: 661 328 1827

Louisiana
108 Nova Drive
Broussard, Louisiana 70518
United States
Phone: 337 839 2400
Fax: 337 839 2211

190 Thompson Road
Houma, Louisiana 70363
United States
Phone: 985 851 1111
Fax: 985 851 1117

Mississippi
2930 Industrial Blvd.
Laurel, Mississippi 39440
United States
Phone: 601 649 8671
Fax: 601 649 8673

New Mexico
#14 CR 5860
Farmington, New Mexico 87401
United States
Phone: 505 326 4303
Fax: 505 326 4304

North Dakota
3202 1st Avenue West
Williston, North Dakota 58801
United States
Phone: 701 774 0091
Fax: 701 774 0092

Oklahoma
3800 Thomas Road
Oklahoma City, Oklahoma 73179
United States
Phone: 405 677 2484
Toll Free: 877 760 1711
Fax: 405 677 2457

Texas
1249 Commerce Road
Alice, Texas 78332
United States
Phone: 361 664 8013
Fax: 361 664 0462

8411 Irvington Boulevard*
Houston, Texas 77022
United States
Phone: 713 691 7800
Fax: 713 691 7807

2810 Highway 135 North
Kilgore, Texas 75662
United States
Phone: 903 984 2553
Fax: 903 984 7170

10720 West I-20 East
Odessa, Texas 79765
United States
Phone: 432 563 1173
Fax: 432 563 1182

30444 Southwest Freeway
Rosenberg, Texas 77471
United States
Phone: 281 341 5365
Fax: 281 344 1986

Utah
1553 East Highway 40
Vernal, Utah 84078
United States
Phone: 435 789 0670
Fax: 435 789 6568

West Virginia
Route 2, Murphy Run Road
Clarksburg, West Virginia 26301
United States
Phone: 304 622 4303
Fax: 304 623 2174

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1283 N. Derrick Drive
Unit 1, Box 2
Casper, Wyoming 82604
United States
Phone: 307 237 3100
Fax: 307 237 2546

Canada
9120 – 34A Avenue
Edmonton, Alberta T6E 5P4
Canada
Phone: 780 702 5209
Fax: 780 463 2348

3550 93 Street*
Edmonton, Alberta T6E 5N3
Canada
Phone: 780 944 3929
Fax: 780 430 0760

1100 540 5th Avenue SW (Mailing)
1010 540 5th Avenue SW (Office)
Calgary, Alberta T2P 0M2
Canada
Phone: 403 250 8000
Fax: 403 294 5790

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Winchcombe
Cheltenham
Glos, GL54 5NS
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Fax: 971 4 8838795

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Jl. Raya Cilandak KKO
P.O. Box 7541
Jakarta, 12560
Indonesia
Phone: 62 21 782 6088
Fax: 62 21 782 6086

Scotland
10 Kirkton Avenue
Pitmedden Road Industrial Estate
Dyce, Aberdeen AB21 0BF
Scotland
Phone: 441 224 334800
Fax: 441 224 723034

Singapore
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Singapore, 639335
Singapore
Phone: 65 68611566
Fax: 65 68610728

Germany
Edesser Straße 1
31234 Edemissen Berkhöpen
Postfach 31232
Germany
Phone: 49 5176 97670
Fax: 49 5176 9767 22

* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions